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<b>(51) International Patent Classification <sup>5</sup> :</b> <b>A61K 7/50, 7/075, C11D 17/00, 9/26, 9/44</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 95/03782</b> <b>(43) International Publication Date:</b> 9 February 1995 (09.02.95)
<b>(21) International Application Number:</b> PCT/AU94/00421 <b>(22) International Filing Date:</b> 26 July 1994 (26.07.94)  <b>(30) Priority Data:</b> PM 0246 28 July 1993 (28.07.93) AU  <b>(71) Applicant (for all designated States except US):</b> ICI AUSTRALIA OPERATIONS PROPRIETARY LIMITED [AU/AU]; 1 Nicholson Street, Melbourne, VIC 3000 (AU).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> WANSBOROUGH, Katherine, Margaret [AU/AU]; 249 Forest Road, Boronia, VIC 3155 (AU). LOMBARD, Anne, Maree [AU/AU]; 23 Rowell Street, Rosanna, VIC 3084 (AU). JONES, Pamela, Joyce [AU/AU]; 12 Nartee Place, Wilberforce, NSW 2756 (AU).  <b>(74) Agent:</b> DAVY, John, R.; Industrial Property Division, ICI Australia Operations Proprietary Limited, 1 Nicholson Street, P.O. Box 4311, Melbourne, VIC 3001 (AU).		<b>(81) Designated States:</b> AU, CA, GB, KR, NZ, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> PEARLESCENT BASED CONCENTRATE FOR PERSONAL CARE PRODUCTS  <b>(57) Abstract</b>  A pearlescent based concentrate and method of preparation wherein the concentrate comprises at least one alkylpolysaccharide, traditional pearlescent ester or acid and alkyl sulphates. The concentrate is suitable for use in personal care products of low irritancy to the skin of users.		

**PEARLESCENT BASED CONCENTRATE  
FOR PERSONAL CARE PRODUCTS**

The invention relates to pearlescent based concentrates comprising at least one alkylpolysaccharide, traditional  
5 pearlescent esters or acid and alkyl sulphates and to processes for the preparation thereof.

Personal care products such as handsoaps, bubble baths, shampoos and hair conditioners often include in their composition agents which impart a pleasant, pearl-like glossy  
10 appearance in order to enhance the appeal of such products to the consumer. The agents which impart this appearance are known as pearlescent based concentrates and generally comprise microscopic platelike crystals which remain  
15 dispersed in compositions to which they are added and reflect light in such a manner as to impart a pearl-like appearance.

Pearlescent based concentrates of the prior art have included finely divided natural substances or inorganic compounds such as mica, fish scale, bismuth oxychloride or the like. For example, Japanese patent application no.  
20 90/134,825 (Priority Date; 24 May 1990) describes compositions for cosmetics having a pearly appearance, comprising glucose fatty acid esters and mica and/or mica Ti.

In recent years, the use of a fatty acid glycolic ester in pearlescent concentrates has been particularly favoured.  
25 In general such concentrates are produced by adding a fatty acid glycolic ester which is solid at room temperature to a composition such as shampoo or the like, followed by heating of the mixture to melt the fatty acid glycolic ester, and then by cooling to recrystallise it and thereby providing  
30 small crystals which impart a pearl-like gloss to the composition. In an alternative method of production, a pearling agent dispersion (such as a fatty acid glycolic ester dispersion, which is dissolved and cooled to recrystallise in advance) is mixed with a shampoo or the like  
35 at room temperature as described in Japanese Patent Application nos. 71021/81 and 216728/83.

Other known pearlescent based concentrates have comprised microcrystalline polyvalent metal salts of higher fatty acids or fatty acid glycolic esters such as those described in United States Patent 4,959,200 (Date of Patent; 25 September 1990).

Other commonly used pearlescent based concentrates have been prepared using ethylene glycol monostearate, ethylene glycol di-stearate, glycerol monostearate, glycerol di-stearate or a cetyl stearyl alcohol or the like in conjunction with other similar esters. These pearlescent based concentrates of the prior art have also normally comprised ether sulphates, betaines, ethanolamide, amine based surfactants and the like which can be used as emulsifiers. United States Patent 5,017,305 (Date of Patent; 21 May 1991) describes a typical pearlescent concentrate in the form of a free-flowing dispersion comprising pearlescing esters, ether carboxylic acids and one or more monoethanolamides of  $C_{12}$  to  $C_{22}$  fatty acids.

One of the disadvantages of the pearlescent based concentrates of the prior art is that they often comprise chemicals which are potential skin sensitisers. Japanese Patent Application no. 21678/83 for example, discloses a pearling agent containing a salt of alkyl sulphate or a salt of polyoxyalkylene alkyl sulphate, a fatty acid dialkanolamide and water as solvents, and a fatty acid glycolic ester at a high concentration. Many factors influence the irritation effect of surfactants and the molecular structure of the surface active agent can be closely linked to its effect on adsorption, solubilization, penetration, swelling, denaturation and general irritation on human skin.

Generally, the order of increasing human skin irritation of anionic surfactants commonly used in personal care products is in the following order:

Ammonium Laureth Sulphate < Sodium Laureth Sulphate < Ammonium Lauryl Sulphate < Sodium Lauryl Sulphate.

Furthermore, some of the pearlescent based concentrates of the prior art have included surfactants which may contain toxic trace impurities which are suspected carcinogens including nitrosamine containing compounds such as

5 diethanolamides. European Patent no. 221465 (22 October 1992) for example, relates to a process for the production of pearlescent pigment comprising ethanolamide.

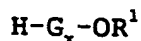
In general, alkyl polyglucosides demonstrate very little tendency to scalp irritations.

10 It has now been found that low irritant pearlescent based concentrates containing biodegradable surfactants can be prepared using alkylpolysaccharides. Ultimate biodegradability was measured using OECD tests 301E and 301A, 1981. Alkylpolysaccharides are particularly attractive

15 for use in personal care products because they contain no toxic trace impurities and because they are derived from renewable resources such as coconut oil and wheat starch.

The current invention therefore provides a pearlescent based concentrate including:

20 between 5 and 40% by weight of the composition of alkylpolysaccharide of formula



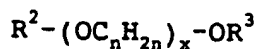
where  $R^1$  is selected from the group comprising linear or branched  $C_6$  to  $C_{22}$  alkyl or alkenyl group

25 where G is selected from the group comprising a  $C_5$  or  $C_6$  saccharide and

x is from 1 to 10;

between 3 and 30% by weight of the composition of alkyl sulphate and/or alkyl ether sulphate;

30 and between 5 and 20% by weight of pearlescing esters of formula



where  $R^2$  is chosen from the group including  $C_{16}$  to  $C_{22}$  fatty acyl groups,

35  $R^3$  is chosen from the group comprising H or  $R^2$ ,

n is 2 or 3 and  
x is from 1 to 120.

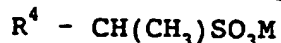
The current invention further provides a pearlescent based concentrate including:

- 5         $H-G_x-OR^1$   
where  $R^1$  is selected from the group comprising linear or branched  $C_6$  to  $C_{22}$  alkyl or alkenyl group  
where G is selected from the group comprising a  $C_5$  or  $C_6$  saccharide and
- 10        x is from 1 to 10;  
between 3 and 30% by weight of the composition of alkyl sulphate and/or alkyl ether sulphate;  
and between 5 to 20% by weight of pearlescing acid of formula  
R COOH
- 15        where R is chosen from the group comprising  $C_{16}$  to  $C_{22}$  alkyl groups.

In a preferred embodiment the pearlescing esters or acid of the current invention is chosen from ethylene glycol monostearate, ethylene glycol distearate, stearic acid and

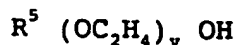
20        mixtures thereof.

In a preferred embodiment the pearlescent based concentrate of the current invention further includes secondary alkane sulphonates of the formula



- 25        where  $R^4$  is chosen from the group comprising  
 $C_6$  to  $C_{22}$  alkyl groups  
and M is chosen from the group comprising alkali metals

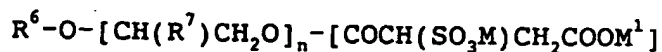
In a further preferred embodiment the fatty alcohol ethoxylates used in pearlescent based concentrate of the current invention are of the formula



- 30        where  $R^5$  is chosen from the group including  
 $C_6$  and  $C_{22}$  alkyl or alkenyl groups  
and y is from 1 to 120

The pearlescent based concentrate of the current invention may further include between 0 and 30% by weight of the composition of one or more optional additives chosen from the group including:

- 5 alkylsulphosuccinate or polyoxyalkylenealkylsulphosuccinate of the formula



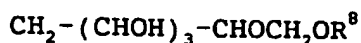
where  $R^6$  is chosen from the group including  $C_8$  to  $C_{20}$  linear or branched alkyl groups,

- 10  $R^7$  is H or  $CH_3$ ,

$M^1$  and M are independently chosen from the group comprising alkali metals, alkaline earth metals,  $NH_4^+$ ,  $C_1$  to  $C_3$  alkyl groups, substituted ammonia and hydroxy substituted  $C_2$  or  $C_3$  alkyl substituted ammonia and

- 15 n is from 0 to 8;

sorbitan fatty acid esters of formula,



where  $R^8$  is chosen from the group including  $C_{12}$  to  $C_{18}$ ; secondary alkane sulphonates; fatty alcohol alkoxylates;

- 20 fatty acid alkoxylates; fatty alcohols; alkanoyl N-methylglucamides; ether carboxylic acids; ethoxylated sorbitan fatty acid esters; and alpha-olefin sulphonates.

In a preferred embodiment the optional additives of the pearlescent concentrate of the current invention includes

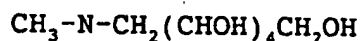
- 25 fatty alcohols of the formula



where  $R^9$  is chosen from the group comprising

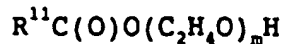
$C_6$  to  $C_{22}$  alkyl groups

- In a further preferred embodiment the optional additives  
30 of the pearlescent concentrate of the current invention includes alkanoyl N-methylglucamides of the formula



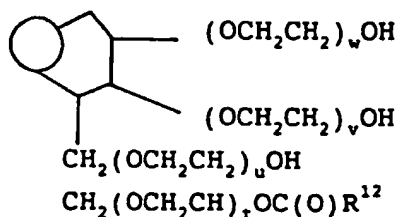
- 35 where  $R^{10}$  is chosen from the group comprising  $C_6$  and  $C_{22}$  alkyl groups.

In another preferred embodiment the optional additives of the pearlescent concentrate of the current invention includes ether carboxylic acids of the formula



- 5 where  $R^{11}$  is chosen from the group includes  $C_6$  to  $C_{22}$  alkyl groups  
and  $m$  is from 1 to 120

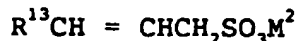
- In a further preferred embodiment the optional additives of the pearlescent concentrate of the current invention  
10 comprise ethoxylated sorbitan fatty acid esters of the formula



15

- where  $R^{12}$  is chosen from the group comprising  
 $C_6$  to  $C_{22}$  alkyl groups  
and  $w, v, u, t$  are from 4 to 20

- In a further preferred embodiment the optional additives  
20 of the pearlescent concentrate of the current invention comprise alpha-olefin sulphonates of formula



- where  $R^{13}$  is chosen from the group comprising  
 $C_6$  to  $C_{22}$  alkyl groups  
25 and  $M^2$  is chosen from the group comprising Na & K.

Another optional additive to the pearlescent based concentrates of the current invention is between 0 and 2% of at least one inorganic salt including alkali metal halide salt such as NaCl, KCl, KI and the like.

- 30 The pearlescent based concentrates of the current invention may also be diluted with between 10 and 90% of the weight of the composition of water or other suitable solvent.

The pearlescent based concentrates of the current invention may also have added optional agents including perfumes, pigments, UV absorbers and antioxidants.

There is further provided a method of preparation of the  
5 pearlescent based concentrates of the current invention comprising the steps of;

- (a) heating the components to a temperature above the highest melting point of the components but less than the boiling point of any solvents present and stirring  
10 to form a homogeneous solution, and
- (b) cooling the stirring solution to a temperature of between 35°C and 45°C at a maximum cooling rate of 15°C/hour.

The pearlescent based concentrates of the current  
15 invention may also be prepared by a method comprising the following steps;

- (a) heating the components to a temperature above the highest melting point of the components but less than the boiling point of any solvents present while stirring  
20 vigorously to form a homogeneous solution,
- (b) rapidly cooling the stirring solution to between 60°C and 70°C, and
- (c) cooling the stirring solution to a temperature of between 35°C and 45°C at a maximum cooling rate of  
25 15°C/hour.

The current invention will now be described with reference to the following non-limiting examples;



**EXAMPLE 1**

A pearlescent based concentrate of the following composition was prepared by the method described below.

<u>Component</u>	<u>Composition</u> (% w/w)
5 Decylpolysaccharide (50% a.i.)	36.00
Sodium lauryl sulphate (30% a.i.)	10.00
Ethylene Glycol mono-stearate	16.25
Sodium chloride	1.00
Water	36.75

**10 Method**

Ethylene glycol monostearate, decylpolysaccharide, alkyl sulphate, water and sodium chloride were heated to 80°C with vigorous stirring. The solution was maintained at 80°C with stirring for further 30 minutes before being rapidly cooled to 65°C. Once the solution temperature reached 65°C the stirring rate was slowed and the solution cooled at a controlled rate of 10°C per hour until the temperature reached 40°C. The stirrer was then stopped and the pearlescent blend allowed to cool to room temperature.

**20 EXAMPLE 2**

A pearlescent based concentrate of the following composition was prepared by the method described below.

<u>Component</u>	<u>Composition</u> (% w/w)
Dodecylpolysaccharide (50% a.i.)	25.00
25 Sodium lauryl sulphate (30% a.i.)	31.00
TERIC 12A23	3.00
Ethylene glycol mono-stearate	12.50
Sodium chloride	1.00
Water	27.50

**30 Method**

Ethylene glycol mono-stearate, dodecylpolysaccharide, sodium lauryl sulphate, TERIC 12A23 water and sodium chloride were heated to 80°C with vigorous stirring. Once the solution had reached 80°C, the stirring rate was slowed and the solution cooled at a controlled rate of 10°C per hour until the solution temperature had dropped to 40°C. When the solution temperature had reached 40°C the stirrer was stopped

and the pearlescent based composition was allowed to cool to room temperature. (TERIC is a registered trade mark of ICI Australia Operations Proprietary Limited).

### EXAMPLE 3

5	<u>Component</u>	<u>Composition</u> (%w/w)
	Decylpolysaccharide (50% a.i.)	37.00
	Sodium lauryl sulphate	10.00
	Cetyl Stearyl alcohol	5.00
	Ethylene glycol monostearate	16.25
10	Water	32.75

#### Method

Ethylene glycol monostearate, decylpolysaccharide, sodium lauryl sulphate, cetyl-stearyl alcohol and water were heated to 75°C with vigorous stirring. The solution was cooled until the temperature reached 70°C at which point the rate of cooling was controlled at 15°C/hour and the stirring rate reduced. When temperature reached 40°C, stirring was stopped and the pearlescent based composition allowed to cool to room temperature.

### 20 EXAMPLE 4

	<u>Component</u>	<u>Composition</u> (%w/w)
	Dodecylpolysaccharide (50% a.i.)	36.00
	Ammonium lauryl sulphate (25% a.i.)	10.00
	Disodium alkyl ethoxy sulposuccinate	
25	(30% a.i.)	13.3
	Sodium chloride	1.0
	Ethylene glycol distearate	16.25
	Water	23.45

#### Method

Dodecylpolysaccharide, ammonium lauryl sulphate, disodium alkylethoxy sulposuccinate and ethylene glycoldistearate were blended together to form a homogeneous mixture. Sodium chloride was then dissolved in the water and added to the mixture which was heated to 70°C with vigorous stirring. When the solution temperature reached 70°C the stirring rate was reduced and the solution cooled at a rate of 8°C/hr. When the solution temperature reached 40°C the

stirring was stopped and the resultant pearlescent based concentrate left to cool to room temperature.

**EXAMPLE 5**

<u>Component</u>	<u>Composition</u> (%w/w)
5 Decyl Polysaccharide	25.00
Sodium lauryl sulphate	20.00
Ethylene glycol monostearate	7.50
Sodium Chloride	1.00
Water	46.5

**10 Method**

The sodium chloride was dissolved in a portion of the water. The remaining components were blended together and the salt solution mixed in. The resultant mixture was heated to 70°C with rapid stirring then the stirring rate was reduced and the mixture cooled at a rate of 8°C per hour. When the mixture reached 40°C all stirring was ceased.

**EXAMPLE 6**

<u>Component</u>	<u>Composition</u> (%w/w)
Decyl Polysaccharide	25.00
20 Sodium lauryl sulphate	20.00
Sorbitan monolaurate	5.00
Ethylene glycol monostearate	15.00
Sodium Chloride	1.00
Water	34.00

**25 Method**

The above components were combined according to the method of Example 5 to form a pearlescent based concentrate.

**EXAMPLE 7**

<u>Component</u>	<u>Composition</u> (%w/w)
30 C8-10 Polysaccharide	5.00
Decyl Polysaccharide	25.00
Sodium lauryl sulphate	20.00
Ethylene glycol monostearate	15.00
Sodium Chloride	1.00
35 Water	34.00

Method

The above components were combined according to the method of Example 5 to form a pearlescent based concentrate.

**EXAMPLE 8**

5	<u>Component</u>	<u>Composition</u> (%w/w)
	Decyl Polysaccharide	30.00
	Ammonium lauryl sulphate	20.00
	Ethoxylated sorbitan monooleate	2.50
	Sodium Chloride	1.00
10	Ethylene glycol monostearate	15.00
	Water	31.50

Method

The above components were combined according to the method of Example 5 to form a pearlescent based concentrate.

**15 EXAMPLE 9**

	<u>Component</u>	<u>Composition</u> (%w/w)
	Decyl Polysaccharide	30.00
	Sodium lauryl sulphate	15.00
	Stearic acid	15.00
20	Sodium Chloride	1.00
	Water	39.00

Method

The above components were combined according to the method of Example 5 to form a pearlescent based concentrate.

**25 EXAMPLE 10**

	<u>Component</u>	<u>Composition</u> (%w/w)
	C16-18 Polysaccharide	10.00
	Decyl Polysaccharide	15.00
	Sodium lauryl sulphate	15.00
30	Ethylene glycol monostearate	15.00
	Sodium Chloride	1.00
	Water	44.00

Method

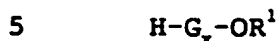
The above components were combined according to the method of Example 5 to form a pearlescent based concentrate.

The pearlescent based concentrates of each example exhibited small crystals of relatively uniform size which give a lustrous appearance to the concentrate and good reflectance.

- 5        While the invention had been explained in relation to its preferred embodiments it is to be understood that various modifications thereof will become apparent to those skilled in the art upon reading the specification. Therefore, it is to be understood that the invention disclosed herein is
- 10 intended to cover such modifications as fall within the scope of the appended claims.

The claims defining the inventions are as follows:

1. A pearlescent based concentrate comprising:  
between 5 and 40% by weight of the composition of  
alkylpolysaccharide of formula



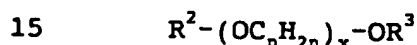
where  $\text{R}^1$  is selected from the group comprising linear or  
branched  $\text{C}_6$  to  $\text{C}_{22}$  alkyl or alkenyl group

where G is selected from the group comprising a  $\text{C}_5$  or  $\text{C}_6$   
saccharide and

10  $x$  is from 1 to 10;

between 3 and 30% by weight of the composition of alkyl  
sulphate and/or alkyl ether sulphate;

and between 5 and 20% by weight of pearlescing compound of  
formula



where  $\text{R}^2$  is chosen from the group including  $\text{C}_{16}$  to  $\text{C}_{22}$  fatty  
acyl groups,

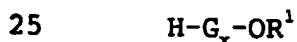
$\text{R}^3$  is chosen from the group comprising H or  $\text{R}^2$ ,

$n$  is 2 or 3 and

20  $x$  is from 0 to 120.

2. A pearlescent based concentrate according to claim 1  
comprising:

between 5 and 40% by weight of the composition of  
alkylpolysaccharide of formula



where  $\text{R}^1$  is selected from the group comprising linear or  
branched  $\text{C}_6$  to  $\text{C}_{22}$  alkyl or alkenyl group

where G is selected from the group comprising a  $\text{C}_5$  or  $\text{C}_6$   
saccharide and

30  $x$  is from 1 to 10;

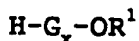
between 3 and 30% by weight of the composition of alkyl  
sulphate and/or alkyl ether sulphate;

and between 5 and 20% by weight of pearlescing acid of formula



where R is chosen from the group including C<sub>16</sub> to C<sub>22</sub> alkyl groups,

3. A pearlescent based concentrate comprising:  
between 5 and 40% by weight of the composition of  
alkylpolysaccharide of formula

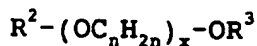


10 where R<sup>1</sup> is selected from the group comprising linear or  
branched C<sub>6</sub> to C<sub>22</sub> alkyl or alkenyl group

where G is selected from the group comprising a C<sub>5</sub> or C<sub>6</sub>  
saccharide and

x is from 1 to 10;

15 between 3 and 30% by weight of the composition of alkyl  
sulphate and/or alkyl ether sulphate;  
and between 5 and 20% by weight of pearlescing esters of  
formula



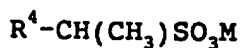
20 where R<sup>2</sup> is chosen from the group including C<sub>16</sub> to C<sub>22</sub> fatty  
acyl groups,

R<sup>3</sup> is chosen from the group comprising H or R<sup>2</sup>,

n is 2 or 3 and

x is from 1 to 120.

25 4. A pearlescent based concentrate according to claim 3  
which further includes secondary alkane sulphonates of the  
formula

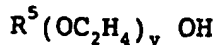


where R<sup>4</sup> is chosen from the group comprising

30 C<sub>6</sub> to C<sub>22</sub> alkyl groups

and M is chosen from the group comprising alkali salts.

5. A pearlescent based concentrates according to claim 3  
wherein said fatty alcohol ethoxylate is of formula



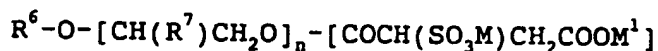
35 where R<sup>5</sup> is chosen from the group including

C<sub>6</sub> and C<sub>22</sub> alkyl or alkenyl groups

and y is from 1 to 120.

6. A pearlescent based concentrate according to claim 3 which further includes between 0 and 30% by weight of the composition of one or more optional additives chosen from the group including:

alkylsulphosuccinate or polyoxyalkylenealkylsulphosuccinate of the formula



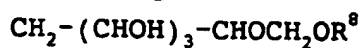
- where  $R^6$  is chosen from the group including  $C_8$  to  $C_{20}$  linear or branched alkyl groups,

$R^7$  is H or  $CH_3$ ,

- M and  $M^1$  are independently chosen from the group comprising alkali metals, alkaline earth metals,  $NH_4^+$ ,  $C_1$  to  $C_3$  alkyl groups, substituted ammonia and hydroxy substituted  $C_2$  or  $C_3$  alkyl substituted ammonia and

n is from 0 to 8;

sorbitan fatty acid esters of formula,



- where  $R^8$  is chosen from the group including  $C_{12}$  to  $C_{18}$  alkyl group;

secondary alkane sulphonates; fatty alcohol alkoxylates; fatty acid alkoxylates; fatty alcohols; alkanoyl N-methylglucamides; ether carboxylic acids; ethoxylated sorbitan fatty acid esters; and alpha-olefin sulphonates.

7. A pearlescent based concentrate according to claim 3 which further includes fatty alcohols of the formula



- where  $R^9$  is chosen from the group comprising  $C_6$  to  $C_{22}$  alkyl groups.

8. A pearlescent based concentrate according to claim 3 which further includes alkanoyl N-methylglucamides of the formula

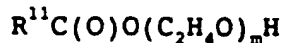


- $CH_3-N-CH_2(CHOH)_4CH_2OH$

where  $R^{10}$  is chosen from the group consisting  $C_6$  and  $C_{22}$  alkyl groups.

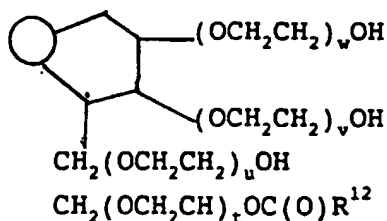


9. A pearlescent based concentrate according to claim 3 which further includes ether carboxylic acids of the formula



where  $R^{11}$  is chosen from the group including  $C_6$  to  $C_{22}$  alkyl groups and  $m$  is from 1 to 120.

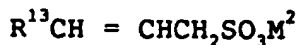
10. A pearlescent based concentrate according to claim 3 which further includes ethoxylated sorbitan fatty acid esters of the formula



where  $R^{12}$  is chosen from the group comprising  $C_6$  to  $C_{22}$  alkyl groups

and  $w, v, u, t$  are from 4 to 20

11. A pearlescent based concentrate according to claim 3 which further includes alpha-olefin sulphonates of formula



where  $R^{13}$  is chosen from the group comprising

$C_6$  to  $C_{22}$  alkyl groups

and  $M^2$  is chosen from the group comprising Na & K.

12. A pearlescent based concentrate according to claim 3 comprising between 0 and 2% of the weight of the composition of inorganic salt.

13. A pearlescent based concentrate according to claim 12 wherein said inorganic salt is an alkali metal halide salt.

14. A pearlescent based concentrate according to claim 3 comprising between 10 and 90% of the weight of the composition of solvent.

15. A pearlescent composition comprising a pearlescent based concentrate according to any of the previous claims and at least one solvent in the ratio of between 10:90 and 90:10 weight %.

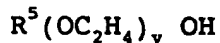
- 5 16. A pearlescent based concentrate according to claim 1 or 2 which further includes secondary alkane sulphonates of the formula



where  $R^4$  is chosen from the group comprising

- 10  $C_6$  to  $C_{22}$  alkyl groups  
and M is chosen from the group comprising alkali salts.

17. A pearlescent based concentrates according to claim 1 or 2 wherein said fatty alcohol ethoxylate is of formula

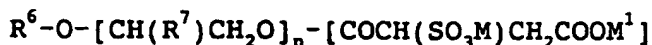


- 15 where  $R^5$  is chosen from the group including

$C_6$  and  $C_{22}$  alkyl or alkenyl groups  
and y is from 1 to 120.

18. A pearlescent based concentrate according to claim 1 or 2 which further includes between 0 and 30% by weight of the composition of one or more optional additives chosen from the group including:

alkylsulphosuccinate or polyoxyalkylenealkylsulphosuccinate of the formula



- 25 where  $R^6$  is chosen from the group including  $C_8$  to  $C_{20}$  linear or branched alkyl groups,

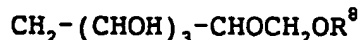
$R^7$  is H or  $CH_3$ ,

M and  $M^1$  are independently chosen from the group comprising alkali metals, alkaline earth metals,  $NH_4^+$ ,  $C_1$  to  $C_3$  alkyl

- 30 groups, substituted ammonia and hydroxy substituted  $C_2$  or  $C_3$  alkyl substituted ammonia and

n is from 0 to 8;

sorbitan fatty acid esters of formula,



- 35 where  $R^8$  is chosen from the group including  $C_{12}$  to  $C_{18}$  alkyl group;

secondary alkane sulphonates; fatty alcohol alkoxylates; fatty acid alkoxylates; fatty alcohols; alkanoyl N-methylglucamides; ether carboxylic acids; ethoxylated sorbitan fatty acid esters; and alpha-olefin sulphonates.

- 5 19. A pearlescent based concentrate according to claim 1 or 2 which further includes fatty alcohols of the formula



where  $R^9$  is chosen from the group comprising  $C_6$  to  $C_{22}$  alkyl groups.

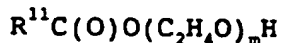
- 10 20. A pearlescent based concentrate according to claim 1 or 2 which further includes alkanoyl N-methylglucamides of the formula



- 15  $CH_3-N-CH_2(CHOH)_4CH_2OH$

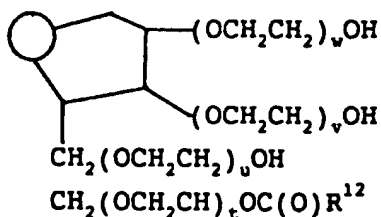
where  $R^{10}$  is chosen from the group consisting  $C_6$  and  $C_{22}$  alkyl groups.

21. A pearlescent based concentrate according to claim 1 or 2 which further includes ether carboxylic acids of the  
20 formula



where  $R^{11}$  is chosen from the group including  $C_6$  to  $C_{22}$  alkyl groups and  $m$  is from 1 to 120.

22. A pearlescent based concentrate according to claim 1 or  
25 2 which further includes ethoxylated sorbitan fatty acid esters of the formula



30

where  $R^{12}$  is chosen from the group comprising  $C_6$  to  $C_{22}$  alkyl groups and  $w, v, u, t$  are from 4 to 20

23. A pearlescent based concentrate according to claim 3 which further includes alpha-olefin sulphonates of formula



where  $R^{13}$  is chosen from the group comprising

- 5         $C_6$  to  $C_{22}$  alkyl groups  
and  $M^2$  is chosen from the group comprising Na & K.

24. A method of preparing a pearlescent based concentrates of any of claims 3 to 15 comprising the steps of;

- 10        (a) heating the components to a temperature above the  
highest melting point of the components but less than  
the boiling point of any solvents present and stirring  
to form a homogeneous solution, and  
(b) cooling the stirring solution to a temperature of  
between 35°C and 45°C at a maximum cooling rate of  
15        15°C/hour.

25. A method of preparing a pearlescent based concentrates of any of claims 3 to 15 comprising the steps of;

- 20        (a) heating the components to a temperature above the  
highest melting point of the components but less than  
the boiling point of any solvents present while stirring  
vigorously to form a homogeneous solution,  
(b) rapidly cooling the stirring solution to between 60°C and  
70°C, and  
(c) cooling the stirring solution to a temperature of  
25        between 35°C and 45°C at a maximum cooling rate of  
15°C/hour.

26. A method of preparing a pearlescent based concentrates of any of claims 1, 2 or 16 to 23 comprising the steps of;

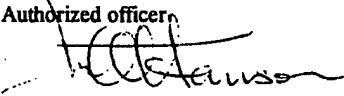
- 30        (a) heating the components to a temperature above the  
highest melting point of the components but less than  
the boiling point of any solvents present and stirring  
to form a homogeneous solution, and  
(b) cooling the stirring solution to a temperature of  
between 35°C and 45°C at a maximum cooling rate of  
35        15°C/hour.

27. A method of preparing a pearlescent based concentrates of any of claims 1, 2 or 16 to 23 comprising the steps of;
- 5 (a) heating the components to a temperature above the highest melting point of the components but less than the boiling point of any solvents present while stirring vigorously to form a homogeneous solution,
- (b) rapidly cooling the stirring solution to between 60°C and 70°C, and
- 10 (c) cooling the stirring solution to a temperature of between 35°C and 45°C at a maximum cooling rate of 15°C/hour.
28. A pearlescent based concentrate substantially as herein described with reference to the examples.
- 15 29. A method of preparing a pearlescent based concentrate as herein described with reference to the examples.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 94/00421

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> Int. Cl. <sup>5</sup> A61K 7/50, 7/075, C11D 17/00, 9/26, 9/44  According to International Patent Classification (IPC) or to both national classification and IPC					
<b>B. FIELDS SEARCHED</b>  Minimum documentation searched (classification system followed by classification symbols) IPC A61K 7/50, 7/075, 7/06, 7/07, C11D 9/26, 9/44.  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU : IPC as above  Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) DERWENT : } (Pearl: ) (Soap ) JAPIO : } (or ) and (or Shampoo ) CASM : } (Pearlesc: ) (or Hair Conditioner )					
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>					
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.			
Y	WO,A, 86/05390 (HELENE CURTIS INDUSTRIES, INC.) 25 September 1986 (25.09.86) Page 5 lines 30-35, Page 18 lines 34-Page 19 line 27 and page 23 Lines 9 to 34	1-29			
P,Y	WO,A, 93/15171 (DEUTSCHE ICI GMBH et al.) 5 August 1993 (05.08.93) Page 2 line 4 - page 3 line 18, Page 6 lines 16-32	1-29			
Y	US,A, 4438096 (HELENE CURTIS INDUSTRIES, INC.) 20 March 1984 (20.03.84) Page 3 lines 24-62, Page 3 4 lines 9-17	1-29			
<div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Further documents are listed in the continuation of Box C.         </div> <div> <input type="checkbox"/> See patent family annex.         </div> </div>					
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top;">           * Special categories of cited documents :            "A" document defining the general state of the art which is not considered to be of particular relevance            "E" earlier document but published on or after the international filing date            "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)            "O" document referring to an oral disclosure, use, exhibition or other means            "P" document published prior to the international filing date but later than the priority date claimed         </td> <td style="width: 33%; vertical-align: top;">           "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention            "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone            "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art            "&amp;" document member of the same patent family         </td> <td style="width: 33%;"></td> </tr> </table>			* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family				
Date of the actual completion of the international search 23 September 1994 (23.09.94)		Date of mailing of the international search report 13 Oct 1994 (13.10.94)			
Name and mailing address of the ISA/AU  AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA  Facsimile No. 06 2853929		Authorized officer:  JOHN G. HANSON  Telephone No. (06) 2832262			

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 94/00421

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
Y	US,A, 5017305 (HENKEL KOMMANDITGESELLSCHAFT AUF AKTIEN) 21 May 1991 (21.05.91)	1-29
A	AU,A, 26058/92 (KAO CORPORATION) 8 April 1993 (08.04.93)	
A	EP,A, 323594 (KAO CORPORATION) 12 July 1989 (12.07.89)	
A	EP,A, 512744 (UNILEVER PLC) 11 November 1992 (11.11.92)	

**PCT/AU 94/00421**

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		EP	215025	JP	62501192	US	4654207
WO	9315171	AU	11813/92				
US	5017305	EP	268992	JP	63150214	US	4824594
AU	26058/92	EP	535693	JP	5117687		
EP	323594	JP	1176445	US	4959206		
EP	512744	GB	9109693	JP	5139940		
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